

REMARKS

Claims 1 – 22 are pending in the present application. Claims 3, 5, 10 – 12 and 20 – 22 were withdrawn from consideration and are hereby cancelled without prejudice. Claims 1 and 16 are currently amended, Claims 23 – 30 are newly added, leaving Claims 1, 2, 4, 6 – 9, 13 – 19 and 23 – 30 for consideration upon entry of the present amendment. No new matter was introduced by this amendment. Applicants respectfully request consideration and allowance of the claims.

Drawings

The Examiner states, "Figs. 2a and 2b do not show undulations on the top surface, as described in the specification and the claims". (Office Action dated 04/12/2005, page 2) However, the direction of undulations on the top surface is substantially parallel with the lines A-A' and B-B', and is substantially perpendicular to the direction of undulations on the bottom surface. Because Figs. 2a and 2b are cross-sectional views taken along lines A-A' and B-B' illustrated in Fig. 1, respectively, it is natural that Figs. 2a and 2b do not show undulations on the top surface while they show undulations on the bottom surface. Therefore, it is believed that corrected drawing sheets are not required in reply to the Office Action. Applicants respectfully request a withdrawal of the objection based upon the aforementioned remarks.

In the Specification

With respect to the title of the invention, please replace "Liquid Crystal Displays With Multi-Domains Effect Formed By Surface Gratings" with -- Liquid Crystal Displays With Multi-Domain Effect Formed By Surface Undulations --.

Claims Rejected Under 35 U.S.C. § 112, Second Paragraph

Claim 16 is rejected under 35 U.S.C. § 112, Second Paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. (Office Action dated 04/12/2005, page 3)

In making the rejection the Examiner has stated that the phrase "[I]f the surface undulation is one-dimensional" is unclear to the Examiner. (Office Action dated 04/12/2005, page 3)

Applicants have accordingly modified Claim 16 by removing the conditional phrase "if". This amendment was not made to overcome any of the cited references. Applicants respectfully request a withdrawal of the rejection and an allowance of the claims.

Claim Rejections Under 35 U.S.C. § 103

Claims 1, 2, 4, 6, 8, 9 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,362,863 to Kataoka et al. (Kataoka) (Office Action dated 04/12/2005, page 4)

For an obviousness rejection to be proper, the Examiner must meet the burden of establishing that all elements of the invention are disclosed in the prior art; that the prior art relied upon, coupled with knowledge generally available in the art at the time of the invention, must contain some suggestion or incentive that would have motivated the skilled artisan to modify a reference or combined references; and that the proposed modification of the prior art must have had a reasonable expectation of success, determined from the vantage point of the skilled artisan at the time the invention was made. *In re Fine*, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988); *In Re Wilson*, 165 U.S.P.Q. 494, 496 (C.C.P.A. 1970); *Amgen v. Chugai Pharmaceuticals Co.*, 927 U.S.P.Q.2d, 1016, 1023 (Fed. Cir. 1996).

Claim 1 is directed to a liquid crystal display comprising an upper substrate having an inner surface on which an upper electrode and an upper grating film having surface undulation are laminated; a lower substrate having an inner surface on which a lower electrode and a lower grating film having surface undulation are laminated, the inner surface of the lower substrate facing the inner surface of the upper substrate; and a liquid crystal having dielectric anisotropy which is sealed in the space between the upper substrate and the lower substrate, wherein each of pixels having a predetermined period includes a plurality of sub pixels having different alignment structures in one period.

Kataoka discloses a liquid crystal display device that includes alignment control layers provided on the inner sides of the substrates and having a saw-tooth cross-section with slopes inclining at an angle relative to the substrate. (see Abstract) The liquid crystal display of Kataoka includes upper and lower alignment control layers each providing a pretilt angle for the liquid crystal, so that the pretilt angle is increased as a function of the alignment control layer (see Abstract; column 6, lines 32-46). In contrast, the liquid crystal display of the present invention includes upper and lower surface undulations providing sub pixels having different alignment structures in one period (claim 1), so that the liquid crystal is rearranged in a multi-domain structure when an electric field is applied.

In addition, despite the Examiner's contention, Kataoka does not mention that the various layers of its liquid crystalline display are laminated. The claimed invention in contrast, is directed to a liquid crystal display comprising an upper substrate and a lower substrate both of which have an inner surface on which an electrode and a grating film having surface undulation are laminated. For this reason at least Kataoka does not teach all elements of the claimed invention.

Since the Examiner has not made a prima facie case of obviousness over Kataoka, Applicants respectfully request a withdrawal of the rejection over Kataoka and an allowance of the claims.

Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being allegedly unpatentable over Kataoka in view of U.S. Patent No. 4,693,557 to Ferguson and U.S. Patent No. 6,535,257 to Miller. (Office Action dated 04/12/2005, page 5)

Ferguson teaches a liquid crystal moving picture projector includes a liquid crystal imager or display device and projection optics for projecting images sequentially created by the imager. (see Abstract) Ferguson, however, in not teaching pixels having a predetermined period wherein the pixels include a plurality of sub pixels having different alignment structures in one period does not make up for the deficiency of Kataoka. Thus the combination of Kataoka and Ferguson does not lead to the claimed invention. Applicants respectfully request a withdrawal of the obviousness rejection over Kataoka in view of Ferguson and an allowance of the claims.

Miller teaches a liquid crystal cell assembly is described which eliminates high-order multiple-beam interference from reflections at the interfaces between the various elements. (see Abstract) Miller like Ferguson, in not teaching pixels having a predetermined period wherein the pixels include a plurality of sub pixels having different alignment structures in one period, does not make up for the deficiency of Kataoka. Thus the combination of Kataoka with Ferguson and Miller does not lead to the claimed invention. Applicants respectfully request a withdrawal of the obviousness rejection over Kataoka in view of Ferguson and Miller and an allowance of the claims.

Claims 1, 2, 4, 6, 7, 13 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,725,915 to Ishitaka et al. (Ishitaka) (Office Action dated 04/12/2005, page 6)

Ishitaka teaches a liquid crystal display wherein each alignment layer has roof like convex and concave rows, formed by repeatedly, in a first direction, forming convex portions each consisting of a longer side portion and a shorter side portion, and valley like concave and convex rows having a height that is lower than that of the roof-like concave and convex rows and formed in the same direction as that of the roof-like concave and convex rows. (see Abstract) The liquid crystal display of Ishitaka therefore includes convex portions formed on the surface of the alignment layer having a longer side portion and a shorter side portion, so that a sufficiently large pretilt angle can be obtained and generation of domains can be prevented (see Abstract, column 46, lines 27-24). Ishitaka however, does not teach a liquid crystalline display that includes upper and lower surface undulations providing sub pixels having different alignment structures in one period, so that a multi-domain structure can be obtained. For this reason at least Ishitaka does not teach all elements of the claimed invention and cannot render the instant invention obvious. Applicants respectfully request a withdrawal of the obviousness rejection over Ishitaka and an allowance of the claims.

Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ishitaka, as applied above, in view of U.S. Patent No. 5,677,744 to Yoneda et al. (Yoneda) (Office Action dated 04/12/2005, page 7)

Yoneda teaches a display device including a coordinate input section for inputting coordinates of a point on the first substrate. (see Abstract) Yoneda, like Ishitaka, does not teach a liquid crystalline display that includes upper and lower surface undulations providing sub pixels having different alignment structures in one period, so that a multi-domain structure can be obtained. For this reason at least the claimed invention is not obvious over the combination of Ishitaka and Yoneda. Applicants therefore respectfully request a withdrawal of the obviousness rejection over Ishitaka in view of Yoneda and an allowance of the claims.

Claim 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishitaka, as applied above, in view of Japanese Document No. 01-270024 to Hirai et al (Hirai) (Office Action dated 04/12/2005, page 7)

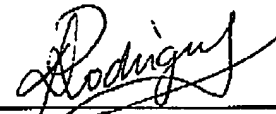
Hirai teaches compensation films between the outer surfaces on the upper substrate and the lower substrate and the respective polarizers, wherein the optic axes of the compensation films are configured to form approximately 45 degrees to the optic axes of the relevant polarizers. Hirai also does not teach a liquid crystalline display that includes upper and lower surface undulations providing sub pixels having different alignment structures in one period, so that a multi-domain structure can be obtained. For this reason at least the claimed invention is not obvious over the combination of Ishitaka and Hirai. Applicants therefore respectfully request a withdrawal of the obviousness rejection over Ishitaka in view of Hirai and an allowance of the claims.

In the event the Examiner has any queries regarding the presently submitted response, the undersigned respectfully requests the courtesy of a telephone conference to discuss any matters in need of attention. If there are any associated or additional charges with respect to this Response or otherwise, please charge them to Deposit Account No. 06-1130 maintained by Applicants' attorneys.

Respectfully submitted,

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